Solution #232

Given: 4-year term insurance on (40)

$b^{(1)} = 2000$ $\quad b^{(2)} = 1000$

$\pi = 34$ $\quad v = 0.95$

x	$l_x^{(\tau)}$	$d_x^{(1)}$	$d_x^{(2)}$
41	800	8	16
42	-	8	16
43	-	8	16

Calculate ${}_2V$

${}_2V = EPV[\text{Future Benefits at time 2}]$

$\quad - EPV[\text{Future Premiums at time 2}]$

$l_{42}^{(\tau)} = l_{41}^{(\tau)} - d_{41}^{(1)} - d_{41}^{(2)}$

$= 800 - 8 - 16$

$= 776$

$l_{43}^{(\tau)} = 776 - 8 - 16$

$= 752$

$$EPV[\text{Benefits}] = b^{(1)}\left[\frac{d_{42}^{(1)}}{l_{42}^{(\tau)}}v + \frac{d_{43}^{(1)}}{l_{42}^{(\tau)}}v^2\right] + b^{(2)}\left[\frac{d_{42}^{(2)}}{l_{42}^{(\tau)}}v + \frac{d_{43}^{(2)}}{l_{42}^{(\tau)}}v^2\right]$$

$$= 2000\left[\frac{8}{776}v + \frac{8}{776}v^2\right] + 1000\left[\frac{16}{776}v + \frac{16}{776}v^2\right]$$

$$= 76.40$$

$$EPV[\text{Premiums}] = \pi\left[1 + \frac{l_{43}^{(\tau)}}{l_{42}^{(\tau)}}v\right]$$

$$= 34\left[1 + \frac{752}{776}v\right]$$

$$= 64.28$$

$$_2V = 76.40 - 64.28 = 11.12 \approx 11$$ (D)